REMARKS

I. Introduction

In response to the pending Office Action, for the reasons set forth below, it is respectfully submitted that even assuming *arguendo* that the combination of the cited prior art was proper, the combination still fails to disclose or suggest the present invention as recited by the pending claims. Moreover, the combination of the references is improper. Accordingly, for the reasons set forth below, Applicants respectfully request withdrawal of the pending rejections.

II. The Rejection Of The Claims Under 35 U.S.C. § 103

Claims 1, 3-6, 13 and 15-29 were rejected under 35 U.S.C. § 103 as being obvious over USP No. 6,605,481 to Wu in view of USP No. 6,664,009 to Liu. For at least the following reasons, it is respectfully submitted that the amended claims are not obvious in view of Wu or Liu, taken alone or in combination with one another, and the combination is improper.

As noted in the previous response, referring to claim 1, the present invention relates to a method of forming a mask for imaging a pattern having a plurality of features on a substrate, in which a plurality of distinct zones are identified based on the critical dimensions of the features, and the features are assigned to one of the distinct zones. The distinct zones include at least three zones, a first zone in which the features are imaged utilizing chromeless phase lithography techniques, a second zone in which the features are imaged utilizing a combination of chromeless phase lithography techniques and chrome, and a third zone in which the features are imaged utilizing chrome. As explained in detail in the specification, by assigning the features to one of these three zones (i.e., a chromeless zone, a combination zone combining chromeless and chrome, and a chrome zone), the present invention allows for critical dimension linearity over a

range of critical dimensions to be imaged. In other words, the present invention provides an easy method of obtain accurate reproduction of features to be imaged even though the width of the features varies over a wide range.

Turning to the cited prior art, while Wu discloses assigning features to different zones, each of the zones disclosed by Wu relate to a different phase shifting priority. For example, Wu discloses defining the different zones based on the size of the phase-shifters to be utilized in the given zone (*see*, Wu, col. 5, lines 23-27). This is apparently done in an effort to minimize and resolve phase-coloring conflicts in the final mask (*see*, Wu, col. 2, line 62 – col. 3, line 9). Importantly, however, there does not appear to be any disclosure in Wu regarding defining three distinct zones, which include a first zone in which the features are imaged utilizing chromeless phase lithography techniques, a second zone in which features are imaged utilizing a combination of chromeless phase lithography techniques and chrome, and a third zone in which features are imaged utilizing chrome.

It is noted that the two sections of Wu relied upon in the pending rejection as suggesting that the features are assigned based on the critical dimension of the features (Wu, col. 5, lines 5-15 and col. 7, lines 13-32) do not do so. Col. 5, lines 5-15 discloses defining the zones based on the size of the phase-shifters to be utilized, which does not necessarily correlate to the size of the feature to be imaged, and col. 7, lines 1-32 defines the zones based on the distance between the features and the type (e.g., gate region) and shape (e.g., feature with a turn) of the features, not the critical dimensions of the features.

Indeed, the primary objective of Wu is to define zones so as to allow the definition and placement of phase shifters within the zone, and to perform a process for detecting and resolving coloring conflicts. By prioritizing the zones based on the phase shifters to be utilized, it is

possible to resolve coloring conflicts (i.e., phase conflicts between the different phase shifters) in an efficient manner. ***Nowhere does Wu disclose or suggest forming and/or imaging features utilizing different techniques based on the zone the given feature is assigned, which is based on the critical dimension of the given feature, as recited by the pending claims. Wu is simply concerned about prioritizing the phase shifters so as to facilitate the resolution of phase conflicts throughout the layout.***

Liu is relied upon as curing the foregoing deficiencies of Wu. Upon review, it is clear that Liu does not do so. Liu similar to Wu teaches a technique for eliminating phase conflicts. Importantly, however, Liu does not teach that features to be imaged can be formed utilizing both chrome and chromeless techniques. In fact, Liu teaches against the use of chrome. In the portion of Liu relied upon in the pending rejection, Liu expressly states:

> However, the requirement of a chrome (or other protective) edge on the phase shifting mask may make definition of certain densely packed features extremely difficult.
>
> Accordingly, what is needed is a method and apparatus **for allowing chromeless** (or more generally, protectionless) **phase transitions** in a phase shifting mask. (Col. 2, lines 36-42).

Thus, Liu teaches against the use of chrome in the mask layout when forming features. Liu notes that chrome can be utilized to form "protect" areas which separate features formed by the phase-shifting material. However, it is clear that this use of chrome does not correspond to that of the present invention, which utilizes chrome in the formation of the features.

Accordingly, even if Wu and Liu were properly combinable, the combination still does ***disclose or suggest forming and/or imaging features utilizing different techniques, including chrome based techniques, based on the zone the given feature is assigned, which is based on the critical dimension of the given feature***. Thus, as each and every limitation must be disclosed or suggested by the combination of the prior art in order to establish a *prima facie* case

of obviousness (*see*, M.P.E.P. § 2143.03), and the combination of Wu and Liu fails to do so, it is respectfully submitted that the pending claims are patentable over the combination of Wu and Liu.

Moreover, as Liu expressly teaches against the use of chrome when attempting to resolve phase conflicts, there is no motivation to modify the teachings of Wu to include the use of chrome based on the disclosure of Liu. As is well known, references that teach away from the claimed invention cannot be properly relied upon as a basis for the requisite motivation required to establish a *prima facie* case of obviousness (*see*, M.P.E.P. § 2145).

Accordingly, for all of the foregoing reasons, it is respectfully submitted that all of the pending independent claims are patentable over Wu and Liu taken alone or in combination with one another.

III. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, ***Hartness International Inc. v. Simplimatic Engineering Co.***, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1, 13, 19 and 26 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also in condition for allowance.

Moreover, with respect to claim 3, 4, 15 and 16, these claims recite that at least one of the features in the first zone are formed by utilizing adjacent phase edges **etched in the substrate**. The pending rejection relies upon Liu as disclosing this feature and states that Liu discloses utilizing chrome between phase shifters. This disclosure of Liu is wholly irrelevant to claims 3,

4, 15 and 16, as using chrome to separate phase shifters edges has nothing to do with forming a feature utilizing two adjacent phase edges etched in the substrate. Moreover, neither reference discloses placing chrome patches on the upper surface of the substrate remaining between the adjacent phase edges as recited by claims 4 and 16. As noted in the specification, these chrome patches are utilized to control the percentage of transmission for Zone 2 features. Neither Wu nor Liu even remotely begin to disclose or suggest this aspect of the present invention. Finally, it is noted that the remaining dependent claims also recite additional novel aspects not disclosed or suggested by the cited prior art references.

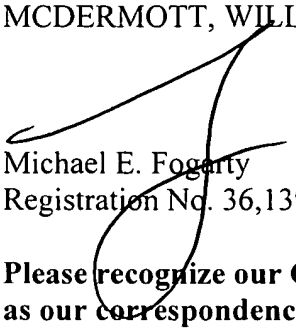
IV. Request For Notice Of Allowance

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

Respectfully submitted,

MCDERMOTT, WILL & EMERY



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